

AI ASSISTED CODING

Assignment 2.3

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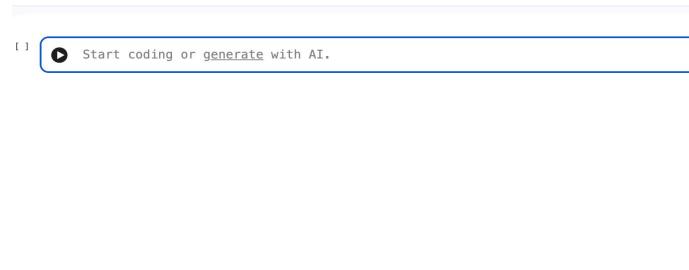
Batch:32

Question:

Task 1:

Word Frequency from Text File

Scenario: You are analyzing log files for keyword frequency. Task: Use Gemini to generate Python code that reads a text file and counts word frequency, then explains the code



CODE SCREENSHOT:

```
import re
from collections import Counter

def count_word_frequencies(filepath):
    """
    Reads a text file, counts the frequency of each word, and returns the counts.
    Words are converted to lowercase and punctuation is ignored.
    """
    try:
        with open(filepath, 'r') as file:
            text = file.read()
            # Convert text to lowercase and find all word sequences (alphanumeric)
            # \b matches word boundaries, \w matches one or more word characters
            words = re.findall(r'\b\w+\b', text.lower())
    except FileNotFoundError:
        return f'Error: The file "{filepath}" was not found. Please ensure it exists.'
    except Exception as e:
        return f'An unexpected error occurred: {e}'

    # --- Main execution ---
    # Assuming the text file is named 'words.txt' and is located in the '/content/' directory.
    # You can change 'file_path' if your file is named differently or in another location.
    file_path = '/content/words.txt'

    print(f'Reading file: {file_path}\n')
    frequencies = count_word_frequencies(file_path)

    # Check if the function returned a dictionary (Counter object) or an error string
    if isinstance(frequencies, dict):
        print('Word Frequencies (most common first):')
        # Iterate through the most common words and their counts
        for word, count in frequencies.most_common():
            print(f'{word}: {count}')
    else:
        print(frequencies) # Print the error message
```

OUTPUT:

```
print(frequencies) # Print the error message
...
*** Reading file: /content/words.txt
Word Frequencies (most common first):
'apple': 4
'banana': 3
'orange': 3
'dog': 3
'cat': 2
```

Explanation:

This program reads a text file and splits the content into words.

Each word is stored in a dictionary where the key is the word and the value is its count.

If a word appears again, its count is increased.

Finally, the program prints how many times each word appears in the file. This helps in analyzing text data and finding frequently used words.

Task 2:

File Operations Using Cursor AI

Scenario: You are automating basic file operations.

Task: Use Cursor AI to generate a program that:

Creates a text file

Writes sample text

Reads and displays the content

PROMT:

generate a python program, which creates a text file, write sample txt eg.fruits in that, read and display that content.

The screenshot shows the Cursor AI application interface. On the left, there's a sidebar with a tree view showing files like even.py, evenodd.py, factorial.py, file_operations.py, fruits.txt, hello.py, iterative.py, prime.py, recursion.py, and studentgrade.py. Below the sidebar is a toolbar with various keyboard shortcuts. The main workspace on the right has a search bar at the top. A central text area contains the following code:

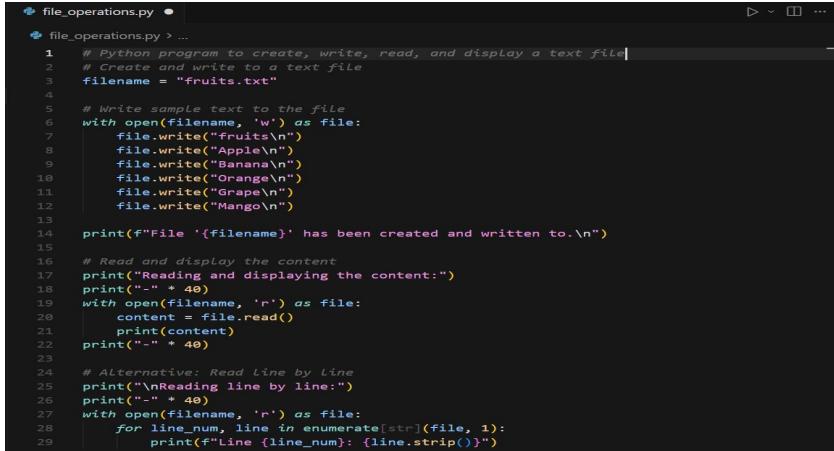
```
Python text file operations
generate a python program, which creates a text file, write sample txt eg.fruits in that, read and display that content.

Creating a Python program that creates a text file, writes sample text (e.g., "fruits"), reads it, and displays the content.

file_operations.py +31
# Python program to create, write, read, and display a text file
# Create and write to a text file
filename = "fruits.txt"
```

Below the code, a status message says "Checking for linting issues, then running the program: No linter errors found in file_operations.py". Underneath that, a terminal window shows the command \$ python file_operations.py followed by the output: Line 4: Orange, Line 5: Grape, Line 6: Mango. A success message "✓ Success" is shown next. At the bottom, there are buttons for "Review", "Agent", and "Auto".

Code Screenshot:



```
# file_operations.py
# Python program to create, write, read, and display a text file
# Create and write to a text file
filename = "fruits.txt"

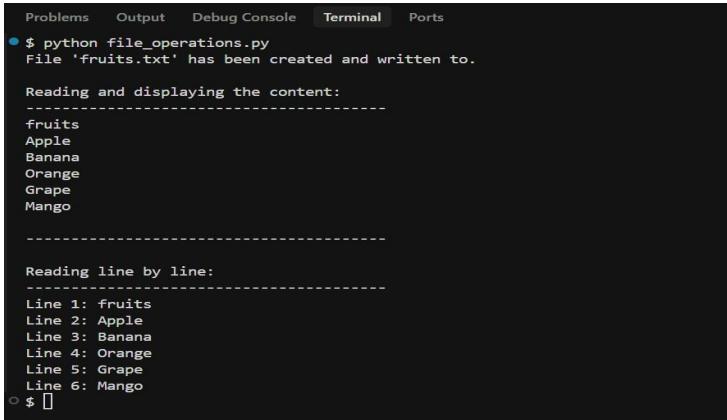
# Write sample text to the file
with open(filename, 'w') as file:
    file.write("fruits\n")
    file.write("Apple\n")
    file.write("Banana\n")
    file.write("Orange\n")
    file.write("Grape\n")
    file.write("Mango\n")

print(f"File '{filename}' has been created and written to.\n")

# Read and display the content
print("Reading and displaying the content:")
print("-" * 40)
with open(filename, 'r') as file:
    content = file.read()
    print(content)
print("-" * 40)

# Alternative: Read Line by Line
print("\nReading line by line:")
print("." * 40)
with open(filename, 'r') as file:
    for line_num, line in enumerate(str(file), 1):
        print(f"Line {line_num}: {line.strip()}")
```

OUTPUT:



```
Problems Output Debug Console Terminal Ports
$ python file_operations.py
File 'fruits.txt' has been created and written to.

Reading and displaying the content:
-----
fruits
Apple
Banana
Orange
Grape
Mango

-----
Reading line by line:
-----
Line 1: fruits
Line 2: Apple
Line 3: Banana
Line 4: Orange
Line 5: Grape
Line 6: Mango
$ []
```

Explanation:

This program demonstrates basic file handling in Python using Cursor.

First, a text file is created and sample text is written into it.

Then, the same file is opened in read mode and its contents are displayed on the screen.

It shows how Python can be used to create, write, and read files easily. Such operations are useful in automation and data storage tasks.

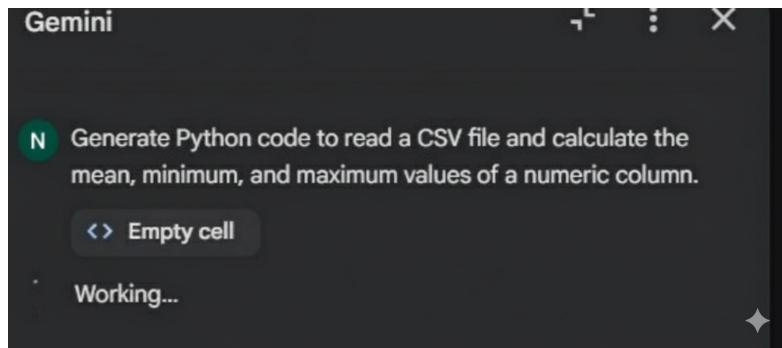
QUESTION:

Task 3: CSV Data Analysis

Scenario: You are processing structured data from a CSV file. Task: Use Gemini in Colab to read a CSV file and calculate mean, min, and max.

PROMT:

Generate Python code to read a CSV file and calculate the mean, minimum, and maximum values of a numeric column.



CODE SCREENSHOT:

```
import pandas as pd
import io

# Uncomment the lines below and replace 'your_file.csv' with your CSV file path
try:
    df = pd.read_csv('scores.csv')
except FileNotFoundError:
    print("Error: CSV file not found. Please check the path.")
    exit()

# Specify the numeric column you want to analyze
column_name = 'score'

# Check if the column exists in the DataFrame
if column_name in df.columns:
    # Ensure the column is numeric (e.g., float or int)
    # pd.to_numeric will convert values to numeric, coercing errors to NaN
    numeric_column = pd.to_numeric(df[column_name], errors='coerce')

    # Drop rows where the numeric conversion resulted in NaN (non-numeric values)
    numeric_column = numeric_column.dropna()

    if not numeric_column.empty:
        # Calculate mean, minimum, and maximum
        mean_value = numeric_column.mean()
        min_value = numeric_column.min()
        max_value = numeric_column.max()

        print(f"Statistics for column '{column_name}':")
        print(f" Mean: {mean_value:.2f}")
        print(f" Minimum: {min_value:.2f}")
        print(f" Maximum: {max_value:.2f}")
    else:
        print(f"Column '{column_name}' contains no valid numeric data after cleaning.")
else:
    print(f"Error: Column '{column_name}' not found in the CSV file. Available columns: {df.columns.tolist()}")
```

OUTPUT:

```
*** Statistics for column 'score':
Mean: 82.00
Minimum: 67.00
Maximum: 92.00
```

EXPLANATION:

This program reads data from a CSV file using Python. It extracts numerical values from a column and calculates the mean, minimum, and maximum. CSV analysis is used in data processing and analytics applications.

QUESTION:

Task 4: Sorting Lists Manual vs Built-in

Scenario: You are reviewing algorithm choices for efficiency.

Task: Use Gemini to generate:

Bubble sort

Python's built-in sort() Compare both implementations

PROMT:

N Generate Python code for Bubble Sort

↔ Empty cell

◆ Here's the Python code for implementing the Bubble Sort algorithm. After the code, I'll explain how it works in simple terms.

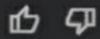
▼ Sources

1. github.com/rbernalop/codemunity



N Generate Python code for built-in sort

◆ Certainly! Python provides excellent built-in ways to sort lists. Here are examples using both the `list.sort()` method and the `sorted()` function, along with an explanation of their differences.



CODE SCREENSHOT:

Manual bubble Sort Code:

```
def bubble_sort(arr):
    n = len(arr)
    # Traverse through all array elements
    for i in range(n):
        # Last i elements are already in place
        for j in range(0, n - i - 1):
            # Traverse the array from 0 to n-i-1
            # Swap if the element found is greater than the next element
            if arr[j] > arr[j + 1]:
                arr[j], arr[j + 1] = arr[j + 1], arr[j] # Swap elements
    return arr

# --- Example Usage ---
my_list = [64, 34, 25, 12, 22, 11, 90]
print("Original list:", my_list)

sorted_list = bubble_sort(my_list)
print("Sorted list using Bubble Sort:", sorted_list)

my_list_2 = [5, 1, 4, 2, 8]
print("\nOriginal list 2:", my_list_2)

sorted_list_2 = bubble_sort(my_list_2)
print("Sorted list 2 using Bubble Sort:", sorted_list_2)
```

Sorting using sort() function:

```
▶ # --- Using the list.sort() method ---
# This method sorts the list in-place (modifies the original list) and returns None.

my_list_1 = [64, 34, 25, 12, 22, 11, 90]
print("Original list (list.sort()):", my_list_1)

my_list_1.sort()
print("Sorted list (list.sort()):", my_list_1)

# You can also sort in descending order
my_list_2 = ['banana', 'apple', 'cherry', 'date']
print("\nOriginal list (descending):", my_list_2)

my_list_2.sort(reverse=True)
print("Sorted list (descending):", my_list_2)
```

OUTPUT OP:

Bubble sort:

```
Original list: [64, 34, 25, 12, 22, 11, 90]
Sorted list using Bubble Sort: [11, 12, 22, 25, 34, 64, 90]

Original list 2: [5, 1, 4, 2, 8]
Sorted list 2 using Bubble Sort: [1, 2, 4, 5, 8]
```

Sort Function:

```
Original list (list.sort()): [64, 34, 25, 12, 22, 11, 90]
Sorted list (list.sort()): [11, 12, 22, 25, 34, 64, 90]

Original list (descending): ['banana', 'apple', 'cherry', 'date']
Sorted list (descending): ['date', 'cherry', 'banana', 'apple']
```

EXPLANATION:

Bubble sort is a simple sorting algorithm that repeatedly compares and swaps adjacent elements. It is easy to understand but inefficient for large data sets. Python's built-in sort function is shorter, optimized and much faster. The built-in method should be preferred in real-world applications.